AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0004	24 July 2003		

6. ISSUED BY	CODE	7. ADMINISTERED BY *(If other than Item 6)*	CODE
US ARMY ENGINEER DISTRICT, FORT WORTH ATTN: CESWF-CT (RM 2A19) PO BOX 17300 FORT WORTH, TX 76102-0300			

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*	(X)	9A. AMENDMENT OF SOLICIATION NO.
	☒	DACW63-03-B-0002
		9B. DATED *(SEE ITEM 11)* 1 JULY 2002
	☐	10A. MODIFICATION OF CONTRACT/ORDER NO.
		10B. DATED *(SEE ITEM 11)*
CODE / FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☒ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☒ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a)By completing items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor ☐ is not, ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (*Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

The Solicitation for REPAIR AND PAINT TAINTER GATES, TOWN BLUFF DAM, WOODVILLE, TEXAS, is amended as follows:

See Continuation Sheet.

NOTE: Bid Opening date and time remain 31 July 2003 at 2 pm, as previously announced.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
15B. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA *(Signature of Contracting Officer)*	16C. DATE SIGNED

Item 14. Continued.

CHANGES TO THE SPECIFICATIONS

1. Replacement Sections - Replace the following section with the accompanying new section of the same number and title, bearing the notation "ACCOMPANYING AMENDMENT NO. 0004 TO SOLICITATION NO. DACW63-03-B-0002:"

SECTION 13110 CATHODIC PROTECTION BY GALVANIC ANODES

CHANGES TO THE DRAWINGS

2. Replacement Drawings.- Replace the drawing listed below with the attached new drawing of the same number, bearing the notation "AM #0004":

S10.cal 13 S10 REPAIR DETAILS I

END OF AMENDMENT

SECTION 13110

CATHODIC PROTECTION BY GALVANIC ANODES
AMENDMENT NO. 0004

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 418	(1995; Rev. A) Cast and Wrought Galvanic Zinc Anodes
ASTM B 843	(1993; R 1998) Magnesium Alloy Anodes for Cathodic Protection
ASTM F 1182	(1990; R 1996) Anodes, Sacrificial Zinc Alloy

NACE INTERNATIONAL (NACE)

NACE RP0169	(1996) Control of External Corrosion on Underground or Submerged Metallic Piping Systems

1.2 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-02 Shop Drawings

Anode layouts; G.

SD-03 Product Data

Anodes; G. Coating resistance of the paint; F.

SD-05 Design Data

Design computations with curves (for example, anode performance), and the data used in the design; G.

SD-06 Test Reports

Initial Field Surveys; G.

SD-07 Certificates

Qualifications of Corrosion Engineer; G

SD-10 Operation and Maintenance Data

Cathodic Protection System, Data Package 5; G

Submit operation and maintenance data in accordance with Section 01781, "Operation and Maintenance Data."; G

SD-11, Closeout Submittals

Initial Cathodic Protection System Field Test Report; G

One Year Warranty Period Cathodic Protection System Field Test Report; G

Final Cathodic Protection System Field Test Report; G

1.3 Services of Corrosion Engineer

The Contractor shall obtain the services of a Corrosion Engineer to design, supervise, inspect and test the installation of the cathodic protection system(s). Corrosion Engineer refers to a registered professional engineer with certification of licensing

that includes education and experience in cathodic protection of submerged metal structures, or a person accredited or certified by the National Association of Corrosion Engineers at the level of Corrosion Specialist or Cathodic Protection Specialist. Such a person shall have not less than five years experience in the cathodic protection of submerged structures. The Contractor shall submit evidence of the qualifications of Corrosion Engineer to the Contracting Officer for review and approval.

1.4 Design Criteria

Number of tainter gates: 6

Locations of anodes each gate:
Upstream: The skin plate, including chain rubbing guards.
Downstream:
The skin plate, including stiffeners, from its bottom edge to above the top of the middle girder.
Bottom and middle girders: Each top and bottom compartment of the webs, flanges and covers, for the full width of the gate.
Each end frame: The two secondary members attached between the bottom and middle girders.
Vertical- and x-bracing attached between the bottom and middle girders.

Perform computations to determine numbers and sizes of anodes of each type. Follow NACE recommended practices in the design of the Cathodic Protection System.

Use the averages of the values of specific resistivity obtained during Initial Field Surveys to design the Cathodic Protection System.

Determine current density for painted carbon steel surfaces and unpainted stainless steel surfaces with the cathodic protection applied.

(AM#4) Design life of the Cathodic Protection System: 20 years.

(AM#4) Coating efficiency: 90-percent; i.e., 10-percent of the steel would become exposed over the life of the Cathodic Protection System because of damage to or deterioration of the paint applied to the gate.

(AM#4) The number of anodes shall be determined using the anode-to-electrolyte and gate-to-electrolyte resistivities.

Water Resistivity (assumed for bidding purposes): 7000 ohm-cm

Negative polarized potential of 850 mV minimum relative to a saturated copper/copper sulfate reference electrode.

Negative (cathodic) potential 850 mV minimum with the cathodic protection applied and measured with respect to a saturated copper/copper sulfate reference electrode contacting the electrolyte.

Cathodic polarization of 250 mV between the structure surface and a stable reference electrode contacting the electrolyte.

On the upstream side of each gate, place additional anodes on the skin plate near the areas where corrosion has been the worst: the chain rubbing guards, the splash zone, and the lower edge of the skin plate. Consider the upstream side to be submerged 100 percent of the time.

PART 2 PRODUCTS

2.1 ANODES

2.1.1 Magnesium

ASTM B 843 Chemical composition as follows:

Aluminum	0.01 percent maximum
Manganese	0.5-1.3 percent
Zinc	-0- percent
Silicon	0.05 percent maximum
Copper	0.02 percent maximum
Nickel	0.001 percent maximum
Iron	0.03 percent maximum

Other Impurities	0.05 percent each, 0.3 percent maximum total
Magnesium	Remainder

a. Bare anode weights: 12 pounds or 24 pounds as required for proper current distribution.

b. Anode type: High-potential, slab-shaped hull type and plastic-coated with exposed areas on top surface to limit current. No more than 50 percent of the plastic on the top shall be removed by the manufacturer or the Contractor prior to installation.

c. Anode dimensions: 18-inch L x 9-inch W x 2-inch H (24-pound) and 9-inch L x 9-inch W x 2-inch H (12-pound)

d. Mounting means: For 12-pound anodes, one cast-in 1/4-inch T x 2-inch W plastic-coated, galvanized steel strap with two 3/4-inch diameter mounting holes, one on each exposed end of the strap. For 24-pound anodes, two cast-in 1/4-inch T x 2-inch W plastic-coated, galvanized steel straps with four 3/4-inch diameter mounting holes, one on each exposed end of each strap.

e. Use 24-pound anodes on upstream side of skinplate and other areas greater than 100 square feet; otherwise use zinc anodes or 12-pound magnesium anodes.

2.1.2 Cast Zinc

ASTM B 418, Type II. ASTM F 1182.

a. Bare anode weight: As required for adequate current distribution.

b. Anode type: Bar or slab, as required to fit the structural steel.

c. Anode dimensions: As required to fit the structural steel.

d. Mounting means: Cast-in 1/4-inch T x 2-inch W galvanized steel straps with two 3/4-inch diameter mounting holes, one on each exposed end of each strap.

e. Use wherever magnesium anodes are too large for the area to be protected.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Anodes

Install anodes as designed and as approved. Provide anodes as follows:

a. If necessary during initial field testing, remove part of plastic covering (from the top surface ONLY) to ensure adequate current. Should overprotection occur, add additional plastic covering.

b. Mount anodes with stainless steel studs welded to gate using stainless steel hex nuts and washers. Stud size shall be nearest size to the size of holes in mounting straps.

3.2 FIELD QUALITY CONTROL

Field tests will be witnessed by the Contracting Officer or his designated representative. Advise the Contracting Officer 5 days prior to performing each field test. Quality control for the cathodic protection system shall consist of the following:

a. Initial Field Surveys by the Contractor upon NTP

b. Initial field testing by the Contractor upon construction

c. Government Field Testing after Contractor initial field test report submission

d. Warranty period field testing by the Contractor

e. Final field testing by the Contractor after one year of service

3.2.1 Testing

3.2.1.1 Non-Destructive Testing of Anodes

Contractor shall perform the tests in the presence of the Contracting Officer. One anode of each type will be chosen at random by the Contracting Officer for non-destructive testing and shall be submerged in a container of fresh water for about 30 minutes. Contractor shall then measure the anode-to-water potential difference between a calibrated copper-copper sulfate reference electrode. Potential differences should generally be within the following ranges:

High-potential Magnesium	-1.65 to -1.75 Volts
Zinc	-1.0 to -1.15 Volts

Failure of the test anode to conform to this specification can be cause for rejecting all anodes from the same lot as the test anode. The Contractor shall mark all rejected anodes on the ends with a 6-inch high "X" using yellow spray paint. Failed anodes shall be removed from the job site by the end of the day. The Contractor shall replace any rejected anodes at his expense. The non-destructive testing provision shall also apply to replacement anodes as well.

3.2.1.2 Destructive Testing of Anodes

Contractor shall perform the tests in the presence of the Contracting Officer. Contractor shall include the cost of an additional anode of each different type. One anode of each type will be chosen at random by the Contracting Officer for destructive testing. The anode shall also be cut into sections and/or broken with a sledge hammer to verify conformance with this specification. Failure of the test anode to conform to this specification can be cause for rejecting all anodes from the same lot as the test anode. The Contractor shall mark all rejected anodes on the ends with a 6-inch high "X" using yellow spray paint. Failed anodes shall be removed from the job site by the end of the day. The Contractor shall replace any rejected anodes at his expense. The destructive testing provision shall also apply to replacement anodes as well.

3.2.1.3 Initial Field Surveys

The Contractor's Corrosion Engineer in the presence of the Contracting Officer's corrosion protection engineer or an approved representative shall make measurements on both the upstream and downstream sides of the tainter gates to determine the specific resistivities of the waters. Make these measurements within 10 days of notice to proceed (NTP) and every 30 days thereafter until all gates have been painted. Record test data, including date, time, and locations of testing for the initial and each monthly survey and submit reports monthly to the Contracting Officer.

3.2.1.4 Initial Cathodic Protection System Field Testing

Systems shall be tested and inspected by the Contractor's Corrosion Engineer in the presence of the Contracting Officer's corrosion protection engineer or an approved representative. Record test data, including date, time, and locations of testing and submit report to the Contracting Officer. Contractor shall correct and retest, at his expense, deficiencies in the materials and installation observed by these tests and inspections. Testing shall include the following measurements.

a. Base potential tests: At least one week after installation of the anodes, measure base (native) structure-to-electrolyte potentials of the structure. Perform a minimum of 30 potential measurements on each tainter gate distributed about all wetted surfaces of the gate. The locations of these measurements shall be identical to the locations specified for potential measurements with anodes connected. Use the same measuring equipment that is specified for measuring protected potential measurements.

b. Permanent reference electrode calibration: Verify calibration of the reference electrode by measuring the potential difference between the permanent reference electrode and an independent (portable) calibrated reference electrode placed in the soil or water adjacent to or as close as practicable to the permanent reference electrode. Potential differences between the two electrodes of the same generic type should not exceed 10 millivolts. Permanent reference electrodes not within these potential differences shall be removed from the construction site by the end of the day and replaced at the Contractor's expense. The testing provision shall also apply to replacement reference electrodes as well.

c. Welded studs: Welds shall be liquid-penetrant tested.

g. Protected potential measurement tests: With the entire galvanic protection system put into operation for at least 48 hours, measure potentials along the structure using a portable copper-copper sulfate reference electrode and a voltmeter having an input impedance of not less than 10 megohm. The locations

of these measurements shall be identical to the locations used for the base potential measurements.

3.2.1.5 Initial Cathodic Protection System Field Test Report

The Contractor shall submit a field test report of the cathodic protection system. All structure-to-electrolyte measurements, including initial potentials and anode outputs, shall be recorded on applicable forms. Identification of test locations shall coordinate with the as-built drawings and be provided on system drawings included in the report.

3.2.1.6 Government Field Testing

The government corrosion engineer shall review the Contractor's initial field testing report. Approximately four weeks after receipt of the Contractor's initial test report, the system will be tested and inspected in the Contractor's presence by the government corrosion engineer. The Contractor shall correct, at his expense, materials and installations observed by these tests and inspections to not be in conformance with the plans and specifications. The Contractor shall pay for all retesting done by the government engineer made necessary by the correction of deficiencies.

3.2.1.7 One Year Warranty Period Testing

The Contractor shall inspect and test the cathodic protection system semi-annually for one year, 2 interim inspections total, to ensure its continued conformance with the criteria outlined below. The performance period for these tests, and the first inspection and test, shall commence upon the completion of all cathodic protection work, including changes required to correct deficiencies identified during initial testing, and preliminary acceptance of the cathodic protection system by the Contracting Officer. Copies of the One Year Warranty Period Cathodic Protection System Field Test Report, including field data, and certified by the Contractor's Corrosion Engineer shall be submitted to the Contracting Officer, the activity, and the government corrosion engineer.

3.2.1.8 Final Field Testing

Conduct final field testing of the cathodic protection system utilizing the same procedures specified under, "Initial Field Testing of the Galvanic Cathodic Protection Systems". The Contractor shall inspect, test, and adjust the cathodic protection system after one year of operation to ensure its continued conformance with the criteria outlined below. The performance period for these tests shall commence upon preliminary acceptance for the cathodic protection system by the Contracting Officer. Copies of the Final Cathodic Protection System Field Test Report, certified by the Contractor's Corrosion Engineer shall be submitted to the Contracting Officer and the area engineer for approval, and as an attachment to the operation and maintenance manual in accordance with Section 01781, "Operation and Maintenance Data".

3.2.2 Criteria for Cathodic Protection

Conduct in accordance with NACE RP0169. Criteria for determining the adequacy of protection shall be selected by the Corrosion Engineer as applicable:

a. A negative voltage of at least 0.85 volt (850 millivolts) as measured between the structure surface and a saturated copper- copper sulfate reference electrode contacting the electrolyte. Determination of this voltage is to be made with the protective current applied to the structure for a minimum of 48 hours..

b. A negative polarized potential of at least 0.85 volt (850 millivolts) as measured between the structure surface and a saturated copper-copper sulfate reference electrode contacting the electrolyte. Determination of this voltage is to be made after the protective current has been applied to the structure for a minimum of 48 hours.

c. A minimum polarization voltage shift of 250 mV measured between the structure surface and a saturated copper-copper sulfate reference electrode contacting the electrolyte. This voltage shift shall be determined by interrupting the protective current and measuring the polarization decay. At the instant the protective current is interrupted ("instant off"), an immediate voltage shift will occur. The voltage reading just after the immediate shift shall be used as the base reading from which to measure the polarization decay. The polarization decay shall be the difference between the base reading and a voltage measurement made 48 hours after the interruption of protective current.

-- End of Section --